

## WHAT IS TO BE CLAIMED:

1. A superconducting material comprising a structure wherein  $C_{20}$  Fullerene molecules are polymerized into a one-dimensional chain.

2. A superconducting material according to claim 1, wherein  $C_{20}$  Fullerene molecules are bound via  $sp^3$ -bond.

3. A superconducting material according to claim 2, wherein no  $sp^3$ -bond exists other than bonding portions between the  $C_{20}$  Fullerene molecules.

4. A superconducting material according to claims 1, wherein the material having a structure obtained by injection of electrons or positive holes.

5. A superconducting material according to claims 2, wherein the material having a structure obtained by injection of electrons or positive holes.

6. A superconducting material according to claims 3, wherein the material having a structure obtained by injection of electrons or positive holes.

7. A method for producing a superconducting material, comprising the steps of:

incorporating and polymerizing  $C_{20}$  Fullerene molecules in a porous material which has a large band gap between a valence band and a conduction band;

mounting the porous material incorporating the  $C_{20}$  Fullerene molecules on a semiconductor substrate doped with an acceptor or a donor; and applying electric field to the porous material.

